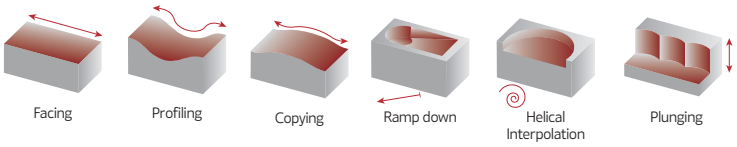
TetraFeed
Double-Sided High Feed Milling Solution



palbit® TOOLING SOLUTIONS EXPERTS SINCE1916

PalbitUSA.com

PILOT Precision Products

NEW

TETRAFEED

XN20-06

PHP NEW GRADE

PHH NEW GRADE

PHS NEW GRADE

INSERT SIZE 06 XNKU 06T3

NEW

SINCE 1916

NEW PHP | PHH - MILLING GRADES

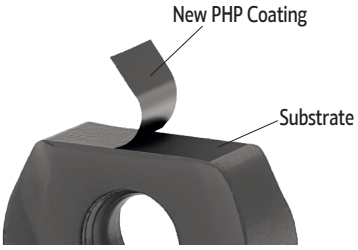
NEW

The new grades PHP and PHH are the result achieved by a new PVD coating technology. This method allows the formation of sputter smooth coatings, with superior adhesion, higher oxidation resistance and improved wear resistance, comparatively to standard PVD coating.

Test results shows that with the same material and cutting conditions this new grades can improve tool life up to 30%.

PHP GRADE - PVD grade

PHP NEW GRADE

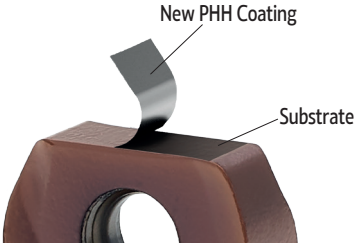


This new PHP coating technology coating provides hardness stabilization which improves wear and welding resistance.

For high-performance applications in unalloyed, alloyed and high-speed steels and suitable for cast iron machining.

PHH GRADE - PVD grade

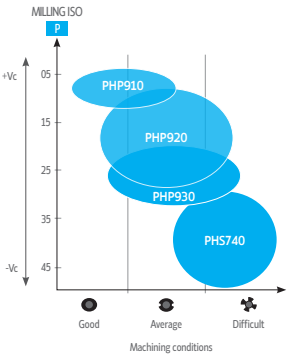
PHH NEW GRADE



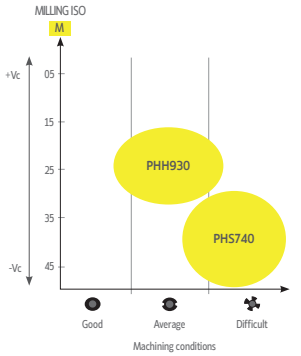
This new PHH coating technology has a very high thermal stability and provides long tool life.

For applications in machining of hardened steels, stainless steels and titanium alloys.

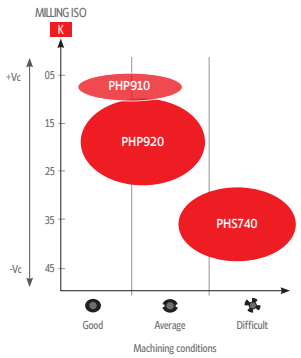
P - STEEL



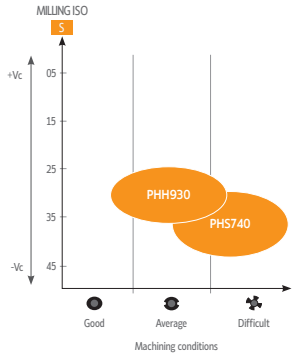
M - STAINLESS STEEL



K - CAST IRON

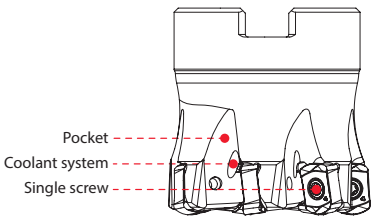


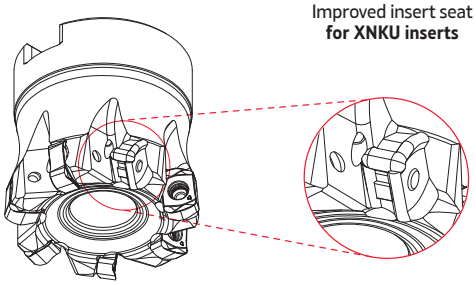
S - HEAT RESISTANT / TITANIUM ALLOYS

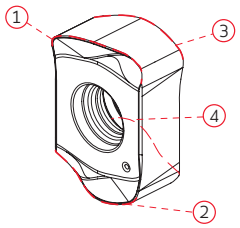


TETRAFEED XN20-06

NEW







MILLING CUTTER

Design
- Optimized design for better chip evacuation

Pocket
- Strong pocket design for better cutter body durability
- Improved insert seat

INSERT

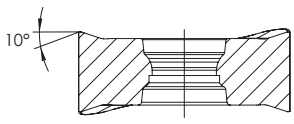
Insert Width
- Large cross section

Cutting edge
- Improved cutting edge
- Improved wear resistance

Double-sided insert
- Double-sided insert with 4 cutting edges

XNKU 06T3

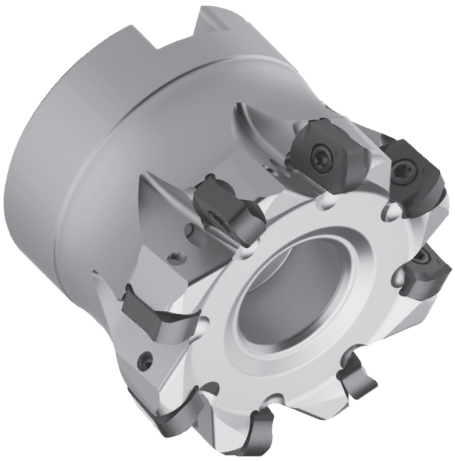
XNKU-MP

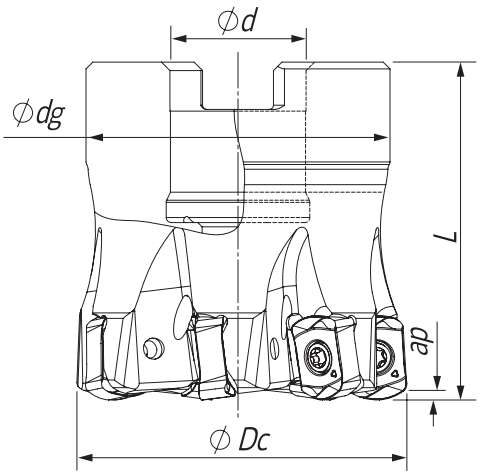


P M K S

GEOMETRY FEATURES

Geometry	Features
Geometry MP General Machining	Geometry with a reinforced cutting edge for general applications on different materials.



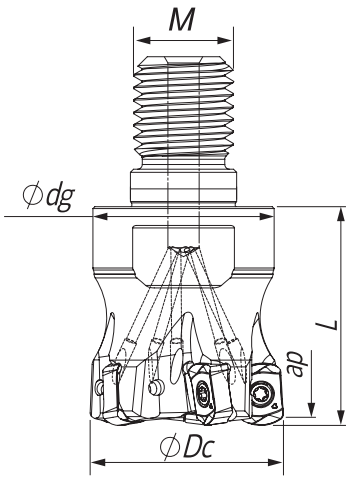


Arbor Mounting

K_r=20° | γ_p=-7° | Rp=0.071

Order Code	Reference		Dimensions (in)				lbs	Specifications		Insert	Stock
			ØDc	Ød/M	Ødg	L		Ap max (in)	Arbor Type		
181169900	XN20 D1.50-A.500/1.50-07-06	7	1.500	0.500	1.450	1.500	0.434	0.040	A	XNKU 06...	○
181170000	XN20 D2.00-A.750/1.50-08-06	8	2.000	0.750	1.770	1.500	0.725	0.040	A	XNKU 06...	◎
181170100	XN20 D2.50-A1.00/1.50-09-06	9	2.500	1.000	1.850	1.500	1.100	0.040	A	XNKU 06...	○

◎ Stock item ○ Available upon request

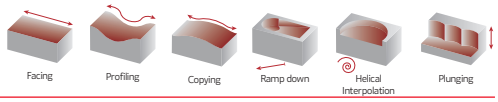


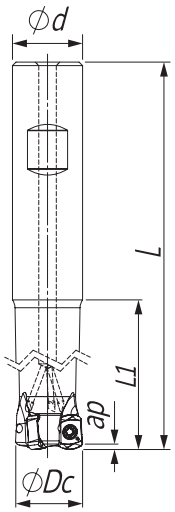
Threaded Coupling

K_r=20° | γ_p=-7° | Rp=0.071

Order Code	Reference		Dimensions (in)				lbs	Specifications	Insert	Stock
			ØDc	Ød/M	Ødg	L		Ap max (in)		
181169400	XN20 D.625-R-08/.984-02-06	2	0.625	M8	0.580	0.985	0.050	0.040	XNKU 06...	◎
181169500	XN20 D.750-R-10/1.18-03-06	3	0.750	M10	0.730	1.180	0.090	0.040	XNKU 06...	◎
181169600	XN20 D1.00-R-12/1.18-04-06	4	1.000	M12	0.905	1.180	0.145	0.040	XNKU 06...	◎
181169700	XN20 D1.25-R-16/1.38-05-06	5	1.250	M16	1.180	1.380	0.340	0.040	XNKU 06...	◎
181169800	XN20 D1.50-R-20/1.58-06-06	6	1.500	M20	1.440	1.575	0.455	0.040	XNKU 06...	◎

◎ Stock item ○ Available upon request



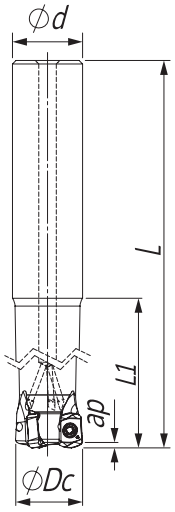


Weldon Shank

K_r=20° | γ_p=-7° | Rp=0.071

Order Code	Reference		Dimensions (in)				lbs	Specifications	Insert	Stock
			ØDc	Ød/M	L	L1		Ap Max (in)		
181170200	XN20 D.625-W.625/3.50-02-06	2	0.625	0.625	3.500	1.250	0.224	0.040	XNKU 06...	●
181170300	XN20 D.750-W.750/4.00-03-06	3	0.750	0.750	4.000	1.750	0.372	0.040	XNKU 06...	●
181170400	XN20 D1.00-W1.00/5.00-04-06	4	1.000	1.000	5.000	2.500	0.782	0.040	XNKU 06...	●
181170500	XN20 D1.25-W1.25/5.00-05-06	5	1.250	1.250	5.000	2.500	1.316	0.040	XNKU 06...	●

● Stock item ○ Available upon request



Cylindrical Shank

K_r=20° | γ_p=-7° | Rp=0.071

Order Code	Reference		Dimensions (in)				lbs	Specifications	Insert	Stock
			ØDc	Ød/M	L	L1		Ap Max (in)		
181170600	XN20 D.625-C.625/6.00-02-06	2	0.625	0.625	6.000	2.000	0.458	0.040	XNKU 06...	●
181170700	XN20 D.750-C.750/6.50-03-06	3	0.750	0.750	6.500	2.950	0.632	0.040	XNKU 06...	●
181170800	XN20 D1.00-C1.00/7.00-04-06	4	1.000	1.000	7.000	4.000	1.106	0.040	XNKU 06...	●
181170900	XN20 D1.25-C1.25/8.00-05-06	5	1.250	1.250	8.000	5.000	2.074	0.040	XNKU 06...	●
181171000	XN20 D1.50-C1.50/5.00-06-06	6	1.500	1.500	5.000	2.250	1.973	0.040	XNKU 06...	●

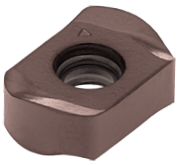
● Stock item ○ Available upon request

TETRAFEED XN20-06 NEW

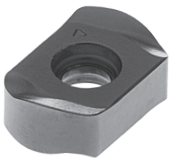
XNKU 06T3... | Inserts

XNKU-MP (PHP grade)

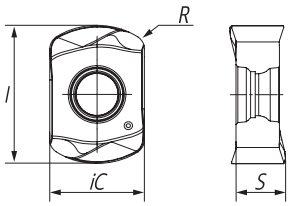
XNKU-MP (PHH grade)



XNKU-MP (PHS grade)



XNKU-MP



(1) Geometry Code	ISO Reference	P				M		K			S		Dimensions (in)				
		CVD	PVD			CVD	PVD	CVD	PVD		CVD	PVD					
	(2) Grade Code	T9	X5	T1	P4	T9	X9	T9	X5	T1	T9	X9					
		PHS740	PHP910	PHP920	PHP930	PHS740	PHH930	PHS740	PHP910	PHP920	PHS740	PHH930	iC	S	I	R	F
1112802	XNKU 06T310-MP	◉	◉	◉	○	◉	◉	◉	◉	◉	◉	◉	0.270	0.142	0.394	0.039	-

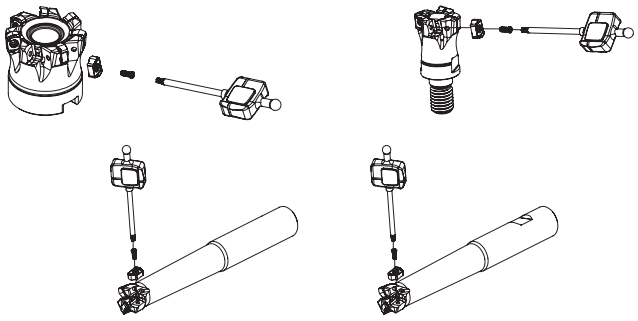
◉ First choice ◉ Stock item ○ Available upon request

Insert order code = (1) Geometry Code + (2) Grade Code

SPARE PARTS

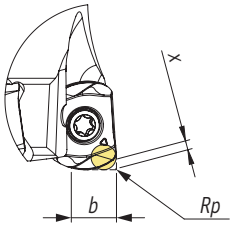
Order separately

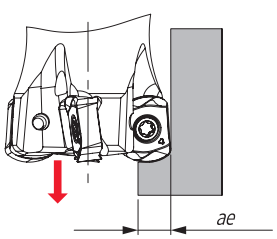
Cutter ØDc	Insert Screw	Key (Torx)	Key (Torx - Nm)	Torque Value
			Nm	lbf/in
XN-A-06 - 1.500-2.500	P0250704	XT08	DT0812	10.6
XN-R-06 - 0.625-1.500	P0250704	XT08	DT0812	10.6
XN-W-06 - 0.265-1.250	P0250704	XT08	DT0812	10.6
XN-C-06 - 0.625-1.500	P0250704	XT08	DT0812	10.6

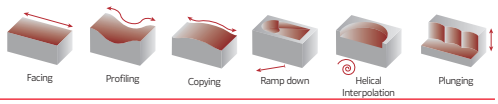


PROGRAMMING DATA

Insert	Programming Data			
	Rp	X	b	a_e
XNKU 06T310-MP	0.071	0.016	0.142	0.134







GRADES SELECTION GUIDE

ISO	PSM	Material	HB (Brinell)	Grades ← Wear Resistance — Toughness → PHP910	PHP920	PHP930	PHH930	PHS740
P	1	Unalloyed Steel	125-220	✓	✓	✓		✓
	2	Low-Alloyed Steel	220-280	✓	✓	✓		✓
	3	High-Alloyed Steel	280-380	✓	✓	✓		✓
M	4	SS - Ferritic / Martensitic	200-330				✓	✓
	5	SS - Austenitic	200-330				✓	✓
	6	SS - Austenitic-Ferritic (Duplex)	230-260				✓	✓
K	7	Malleable Cast Iron	130-230	✓	✓			✓
	8	Gray Cast Iron	180-245	✓	✓			✓
	9	Nodular Cast iron	160-250	✓	✓			✓
S	11	Heat Resistant Super Alloys	200-320				✓	✓

Good Conditions
Average Conditions
Difficult Conditions

RECOMMENDED CUTTING CONDITIONS

ISO	PSM	Material	HB (Brinell)	Vc (sfm) ← Wear Resistance — Toughness → PHP910	PHP920	PHP930	PHH930	PHS740	Feed fz (in/t) XNKU 06...-MP
P	1	Unalloyed Steel	125-220	590-820	590-820	525-755	-	525-755	0.020-0.060
	2	Low-Alloyed Steel	220-280	525-790	560-690	490-625	-	490-620	0.020-0.060
	3	High-Alloyed Steel	280-380	460-755	525-655	460-590	-	460-590	0.020-0.060
M	4	SS - Ferritic / Martensitic	200-330	-	-	-	425-560	395-590	0.020-0.055
	5	SS - Austenitic	200-330	-	-	-	330-525	330-490	0.020-0.055
	6	SS - Austenitic-Ferritic (Duplex)	230-260	-	-	-	260-455	230-420	0.020-0.055
K	7	Malleable Cast Iron	130-230	590-985	590-1050	-	-	525-985	0.020-0.060
	8	Gray Cast Iron	180-245	525-820	560-920	-	-	490-850	0.020-0.060
	9	Nodular Cast iron	160-250	490-690	330-790	-	-	260-720	0.020-0.060
S	11	Heat Resistant Super Alloys	200-320	-	-	-	100-245	100-230	0.020-0.050

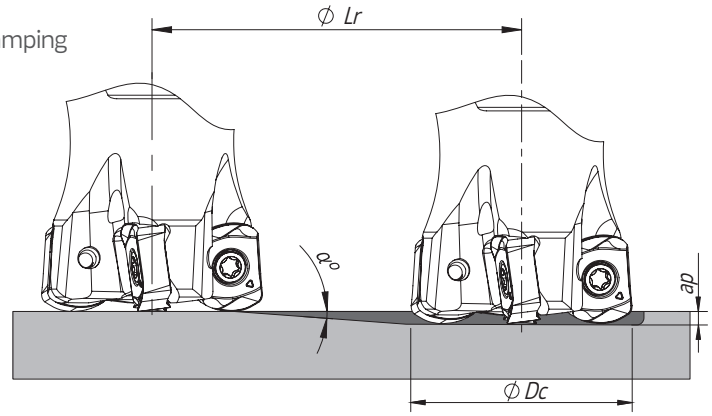
(Note 1) Cutting conditions $a_e/Dc=70\%$.

(Note 2) It is possible for vibrations to occur in certain cases. Please reduce depth of cut and / or reduce cutting conditions in following cases:
- When using long shank;
- When using long tool overhang with arbor type;
- When application has poor clamping rigidity or when using a low rigidity machine.

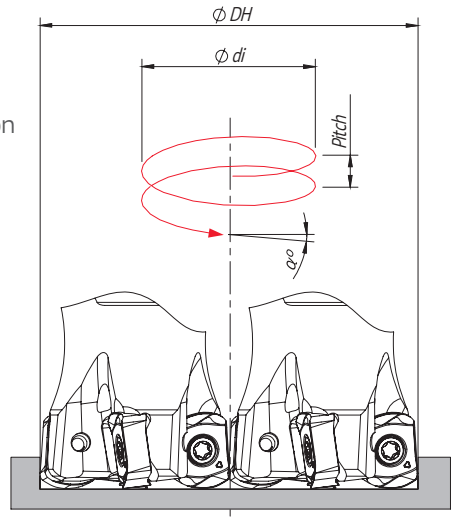
(Note 3) When using ØDc=0.625in apply 70% or less feed (fz) based on table.

RAMPING AND HELICAL INTERPOLATION

Ramping



Helical Interpolation



Blind hole
Flat bottom

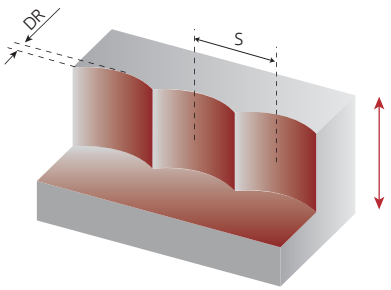
Ødi = ØDH - ØDc

ØDc	Ramping			Helical Interpolation		
	Max Ramp a°	Max a_p	Min Lr	ØDHmin	ØDHmax	Max Pitch/Rev.
0.625	0.5	0.039	4.469	0.966 -	- 1.171	0.009 0.014
0.750	0.5	0.039	4.469	1.216 -	- 1.421	0.012 0.018
1.000	0.8	0.039	2.793	1.716 -	- 1.921	0.031 0.040
1.250	0.8	0.039	2.793	2.216 -	- 2.421	0.042 0.051
1.500	0.4	0.039	5.586	2.716 -	- 2.921	0.026 0.031
2.000	0.3	0.039	7.448	3.716 -	- 3.921	0.028 0.031
2.500	0.25	0.039	8.938	4.716 -	- 4.921	0.030 0.030

Note: During helical interpolation do not exceed max Pitch.
(*) Down cutting is recommended, tool pass rotation should be counter-clockwise.
(*) In case of ramping and helical interpolation, apply 70% or less feed (fz) based on recommended cutting conditions table.

PLUNGING

L≤3Dc	L>3Dc	S max.
f_z (in/t)		
0.004-0.006	0.002-0.004	$Smax = \sqrt{DC.Dr-Dr^2}$



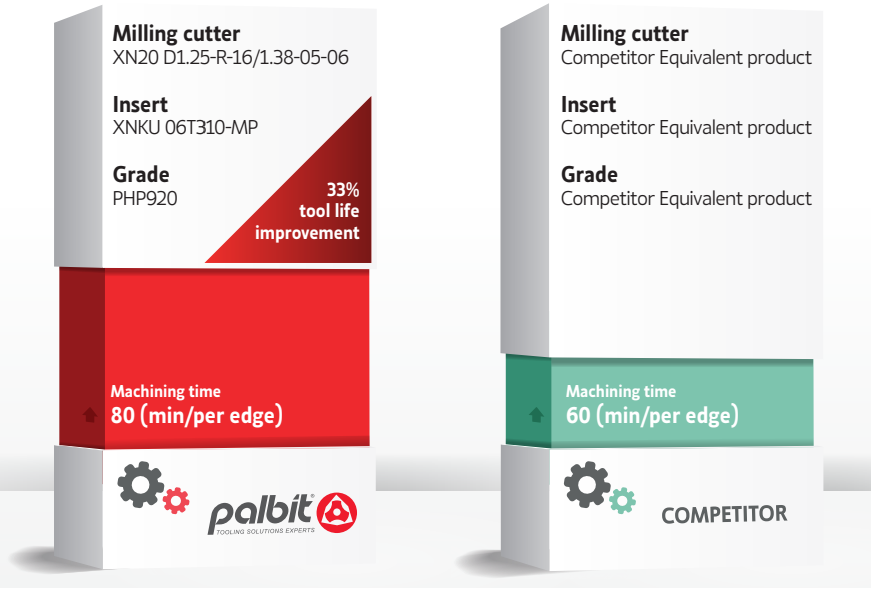
S Max and DR Corresponding Cutting Diameter Dc (in)							
DR (in)	Dc (in)						
	0.625	0.750	1.000	1.250	1.500	2.000	2.500
0.039	0.151	0.167	0.194	0.217	0.239	0.277	0.310
0.079	0.208	0.230	0.270	0.304	0.335	0.390	0.437
0.118	0.245	0.273	0.323	0.365	0.404	0.471	0.530

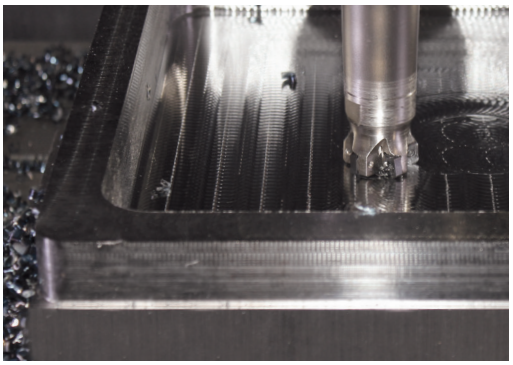
Note: Recommended for L ≤ 4 Dc for extra long tool this step and side cut must be reduced.

TETRAFEED XN20-06 - XNKU 06T3

PHP TEST REPORT

PHP NEW GRADE



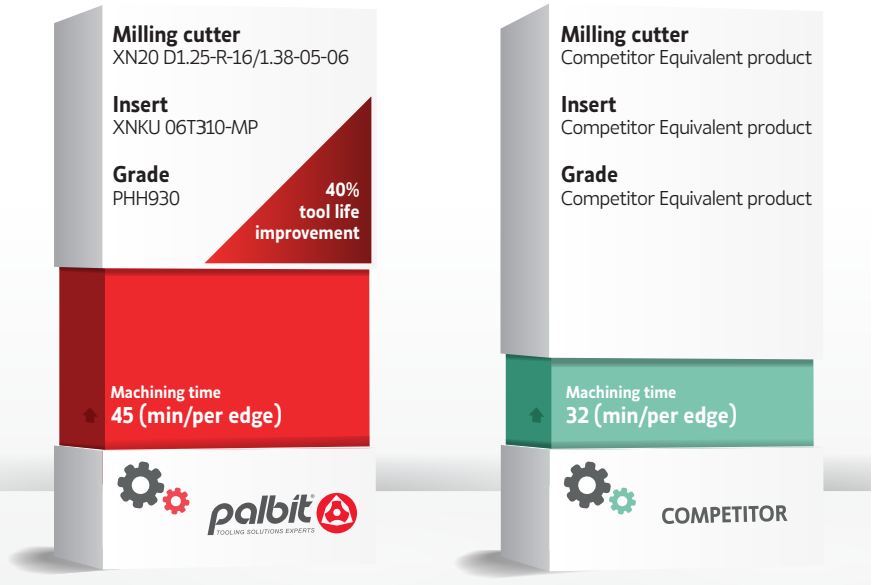


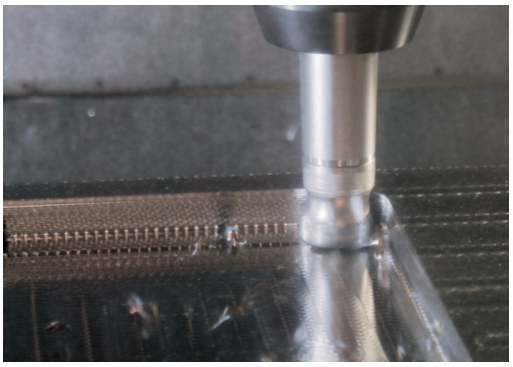
Workpiece material: 40CrMnNiMo7 (1.2738) - (32-36 HRC)

Cutting speed: Vc (sfm)	656
Feed per tooth: fz (in/t)	0.026
Depth of cut: ap (in)	0.039
Width of cut: ae (in)	0.945
Method of machining	Ramping and Helical Interpolation
Coolant	Dry

PHH TEST REPORT

PHH NEW GRADE





Workpiece material: stainless steel, AISI 316

Cutting speed: Vc (sfm)	394
Feed per tooth: fz (in/t)	0.039
Depth of cut: ap (in)	0.020
Width of cut: ae (in)	0.945
Method of machining	Ramping and Helical Interpolation
Coolant	Dry

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